Upper Cottonwood Floodplain Mapping Project Kickoff Meeting

Marion, Kansas

January 15, 2019

Kansas Department of Agriculture
Division of Water Resources

wood.

Your engagement in this process is important to the success of this project, so thank you for taking the time to be here today!

Discussion Topics

- Introductions
- Program Overview
- Project Discussion
  - Overview
  - Scope
  - Timeline
- Community/Stakeholder Responsibilities

Why Have Floodplain Maps?

- Determine where flood insurance is needed and rate its cost.
  - Flood Insurance Rate Map (FIRM)
- To provide the basis for executing community floodplain management ordinances.
- Understand flood risk so communities can make informed planning decisions.

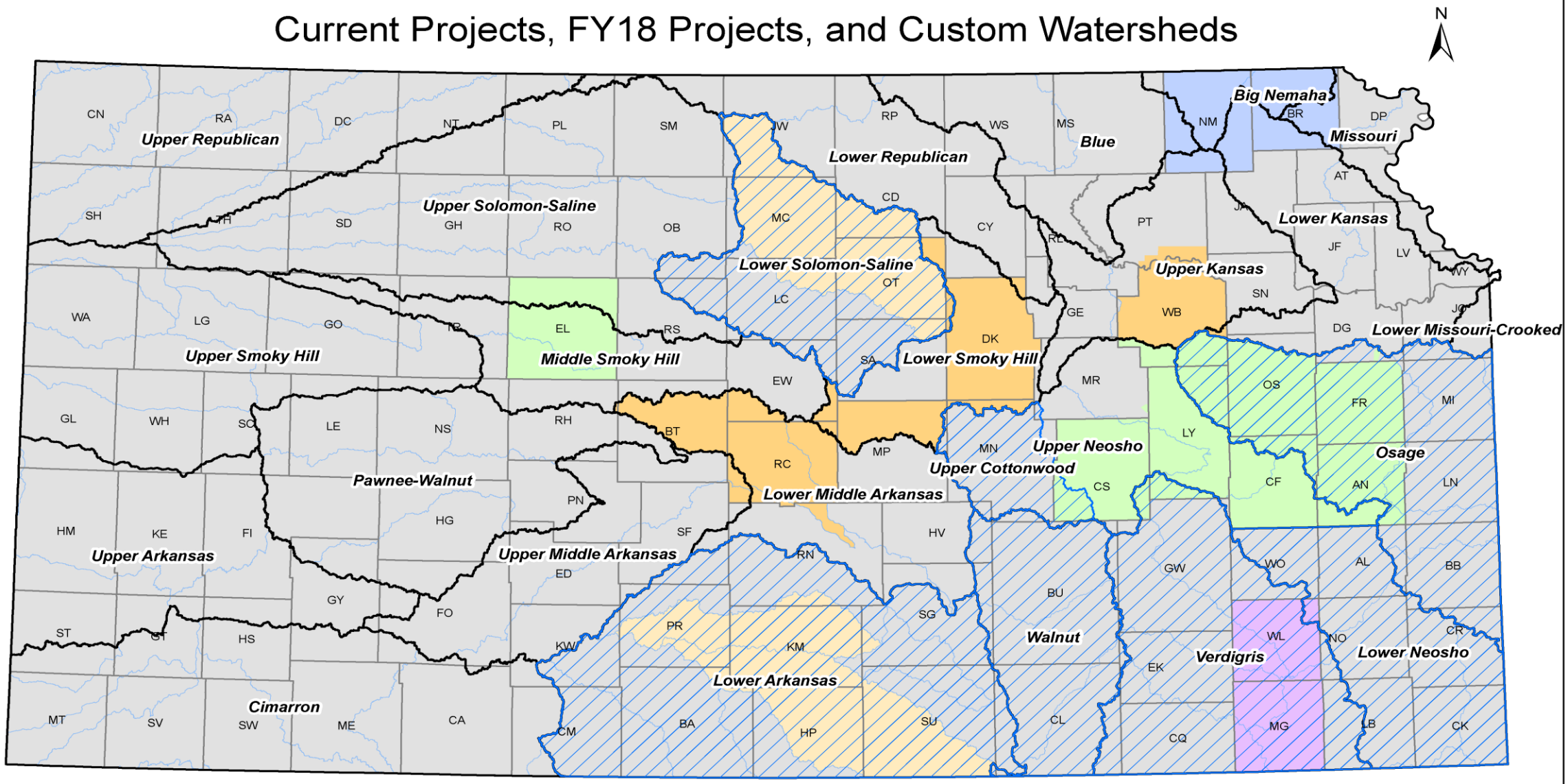
FEMA Floodplain Mapping Program

- Risk Mapping Assessment and Planning
- Supports the National Flood Insurance Program. Performed on a watershed basis.
- Consists of both Regulatory & Non-Regulatory Products.
- FEMA Program that provides communities with flood information and tools they can use to enhance their mitigation plans and take action to better protect their citizens.

RiskMAP

Increasing Resilience Together

Current Projects, FY18 Projects, and Custom Watersheds



Current Projects

- Draft; Partial Draft (PT Phase II in development)
- Preliminary
- Underway

Upcoming FY18 Projects

- FY18 BLE Projects - scalable
- FY18 Regulatory Projects

Watersheds

- FOA Complete (Non-Reg Zone A)
- Custom Watersheds (labeled)
- HUC 8 Watersheds (not labeled)

September 13, 2018

0 25 50 100 Miles

Marion County

Current Effective Maps

- Based on outdated Topography
- Based on outdated Engineering

How Will This Map Be Different?

- New Engineering using 2-D methodology
- LiDAR Topography from 2011
- Enhanced hydrology and incorporation of field measured structures and added detail in Zone AE areas
- Non-Regulatory Flood Risk Products (FRPs)
  - Depth grid – shows the depth of flooding
  - Water Surface Elevation (WSE) grid – shows the flooding elevation or BFE (Base Flood Elevation)

Project Goals

- Update floodplains in the county with modern mapping.
- Produce the highest quality mapping that we can.
- Leave a map that communities BELIEVE.
- Help communities and residents better understand and prepare for their flood risk.

Meeting Goals

- Please provide us comments on the scoping lines by February 22, 2019
  - We are requesting funding for Data Development this year for the FY19 Grant (September) to begin in January of 2020
  - Let us know areas of development where the ground surface has likely changed since the date of the 2011 Lidar
    - Provide us with As-Builts/grading plans and we can update the maps
    - We will have 2018 LiDAR here in April 2019 where we can look for changes in the ground elevation and update if needed

What is Base Level Engineering (BLE)?

- Development of initial draft floodplains
- Based on:
  - LiDAR Topography
  - National Weather Service (NWS) Rainfall
  - National Land Cover Database Land Use
  - NRCS Soil Information
  - USGS Gage Data Calibration
- This is the first run to produce new floodplains, which will be further refined during data development phases

Review

- Begin reviewing the approximate Base Level Engineering (BLE) Data to let us know ahead of time if the floodplains are making sense
- Keep in mind this early BLE floodplain data is subject to change and we are at the very early stages of developing the data
  - Another community review period will occur in the summer of 2019 once we have all of the BLE data complete
  - There will also be another round of Community Review after Data Development and we will have more accurate floodplains at the Flood Risk Review (FRR) Meeting in the Fall of 2020

What is Data Development?

- Engineering modeling & Mapping used for project-wide update
- Considerations include:
  - Enhancements to BLE, including model calibration
  - Additional rainfall-runoff modeling for specific areas and calibration purposes
  - Consideration of historical flooding events and other local data
  - Field-measured survey of structures, where specified
  - Robust review internally and externally
  - Considers and addresses community review comments

Project Tasks

- Base Level Engineering (BLE) – 2019
  - Will complete Base Level Engineering for the County in 2019
- Data Development Tasks – 2020
  - Base Map & Topography
    - Streets, PLSS, political boundaries, LiDAR
  - Perform Field Measurements on specific structures
  - Hydrology & Hydraulics
  - County-wide Floodplain Mapping & FIRM Database
- Preliminary Map Products
- Post-Preliminary Processing

Project Milestones

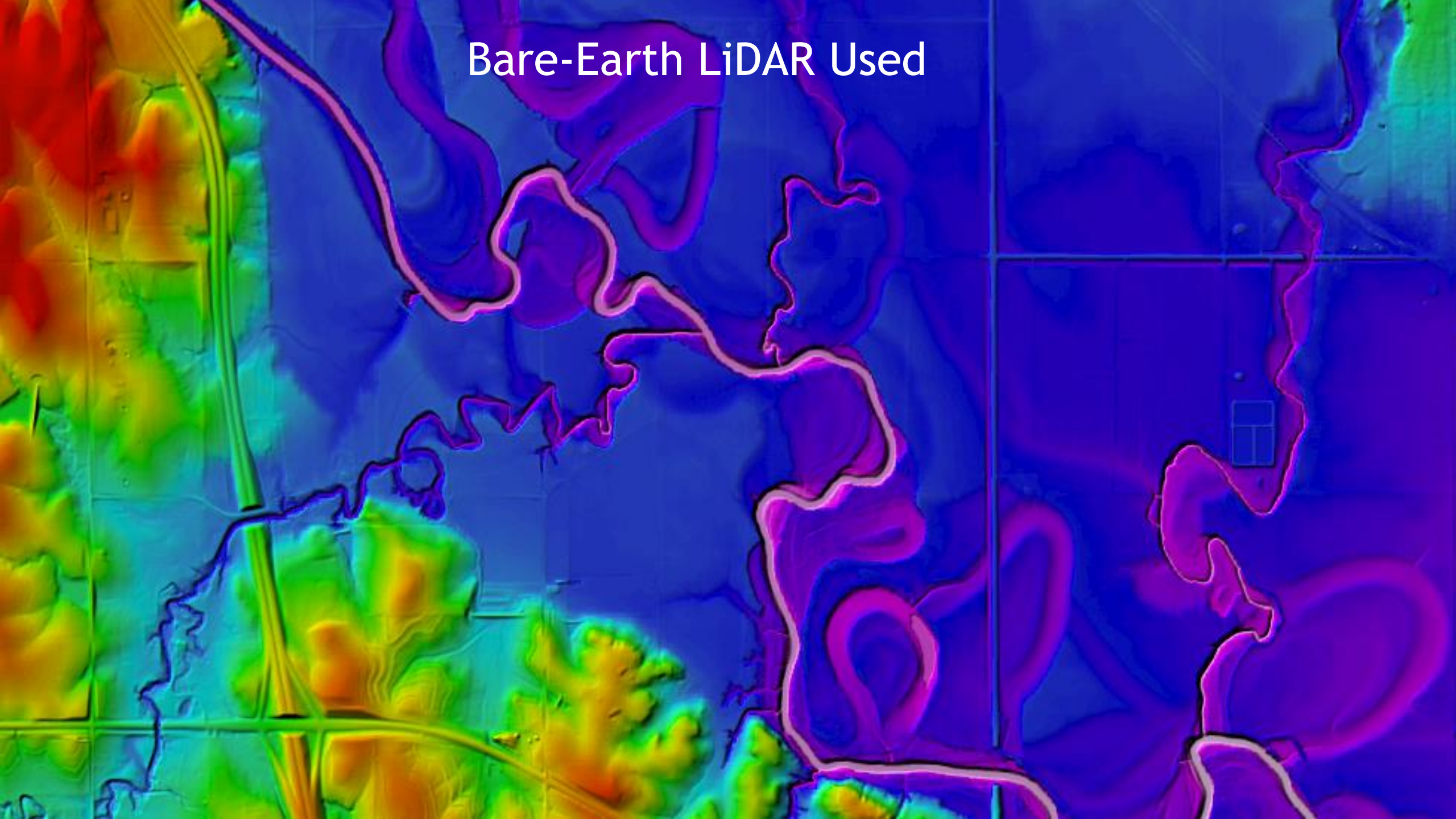
- Kickoff Meeting – January 15, 2019
  - Community review of scope and depiction of County needs and concerns
- BLE Draft Data Creation – Completed in April 2019
- Discovery Meeting- ~June 2019
  - Community review of BLE floodplains
- Data Development – Completed in 2020

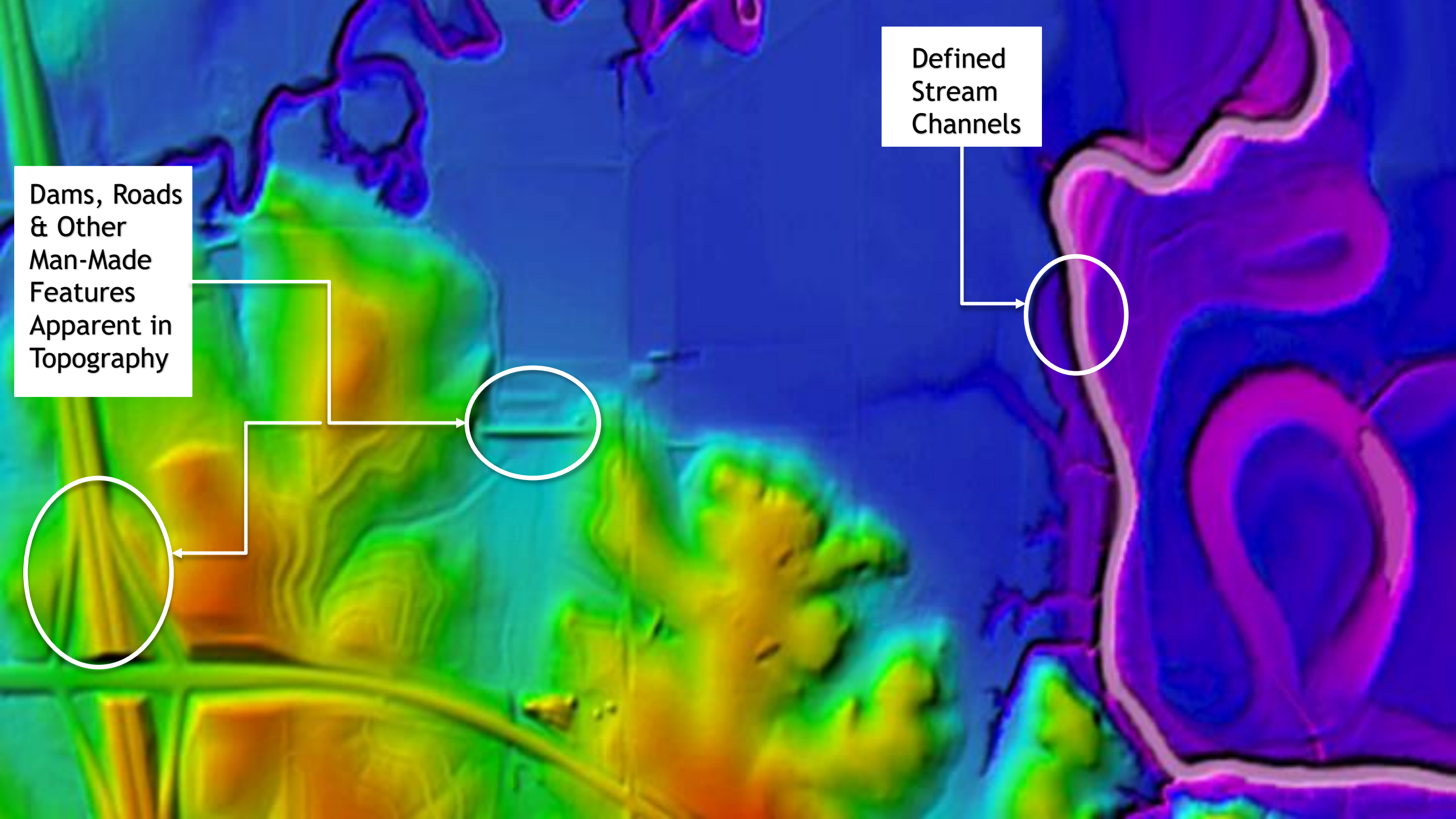
Project Milestones

- Flood Study Review Meeting – Fall 2020
  - Community Review period
- Public Open House – Spring 2021
  - Public Review period
- **Preliminary Map Issuance - Summer 2021**
  - **GOAL: Have all concerns addressed before issuance.**
- Effective Maps Issuance – Fall 2022

BLE Development

- Based on:
  - LiDAR Topography
  - National Weather Service (NWS) Rainfall
  - National Land Cover Database Land Use
  - NRCS Soil Information
  - USGS Gage Data Calibration

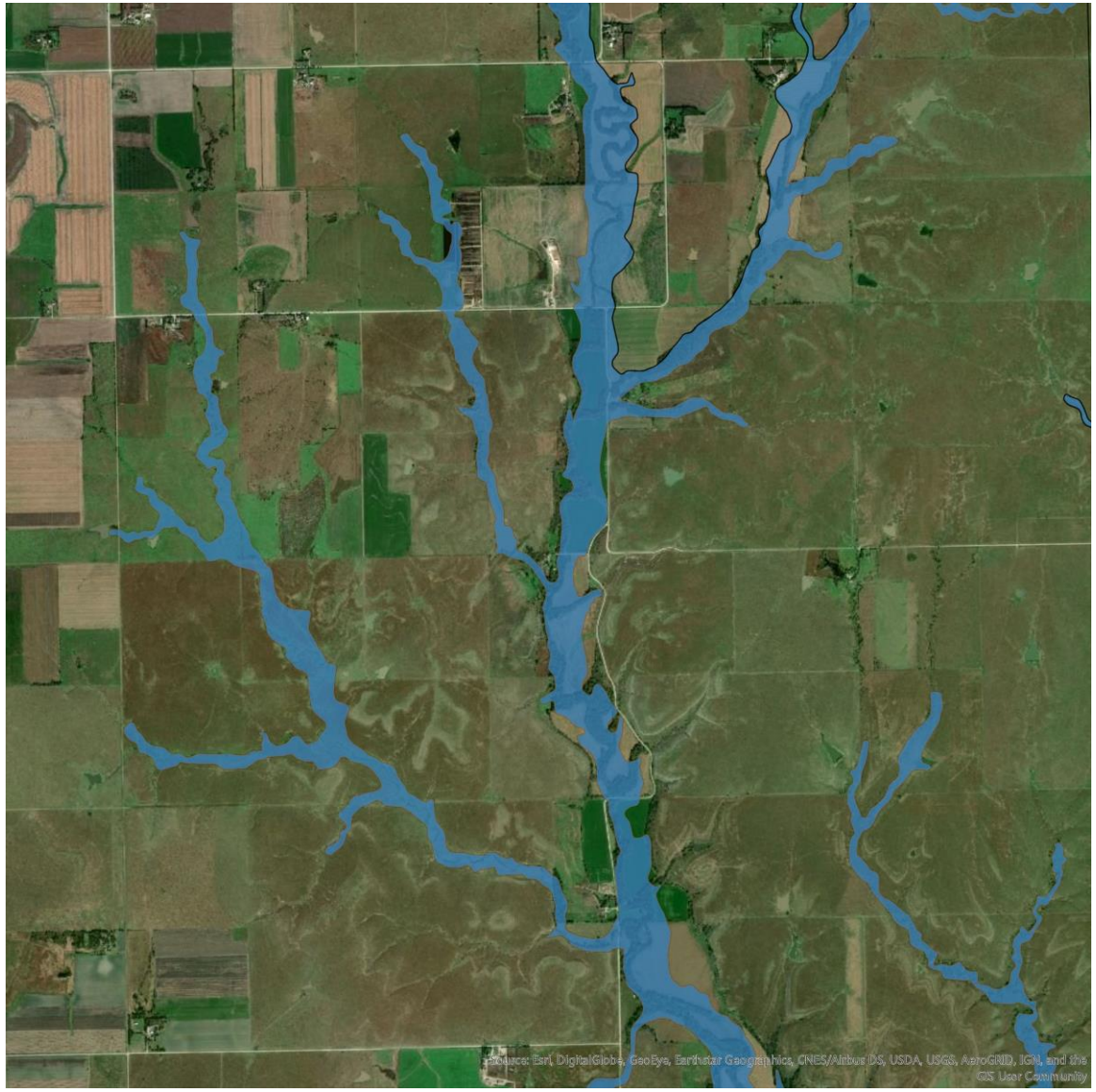

Bare-Earth LiDAR Used


Defined Stream Channels
Dams, Roads & Other Man-Made Features Apparent in Topography

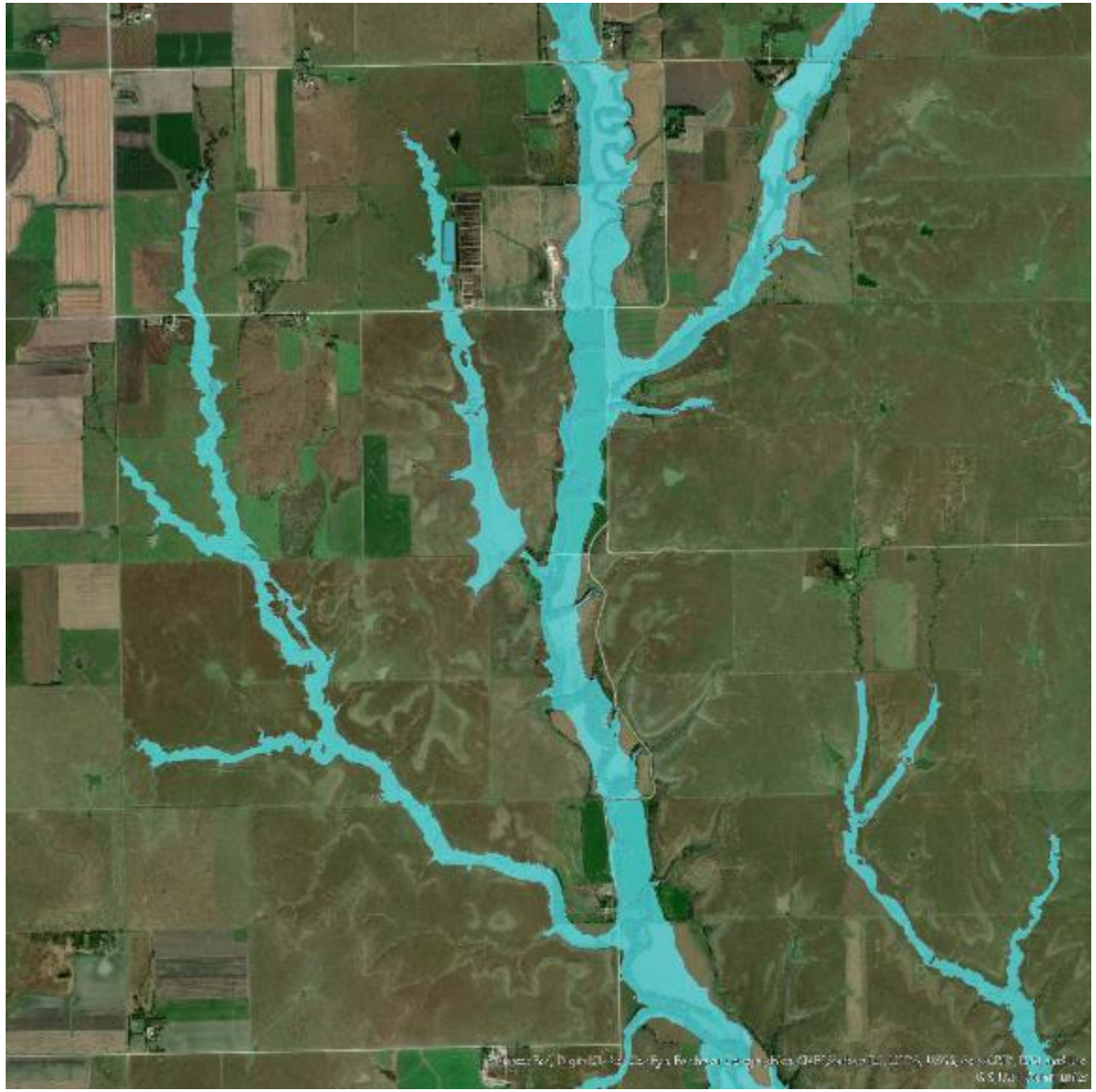
BLE Development

- ***BLE Data will not be developed for the streams in the Lower Cottonwood Watershed as Data Development is Complete***
- **Upper Cottonwood Watershed -** Currently Occurring
- Community will be asked to review the BLE Floodplains around the time of the Discovery Meeting
- Comments from Community BLE Review will be addressed during Data Development phases. Additional reviews will also occur during and after Data Development.

Marion County Effective Floodplains



Marion County Proposed Floodplains



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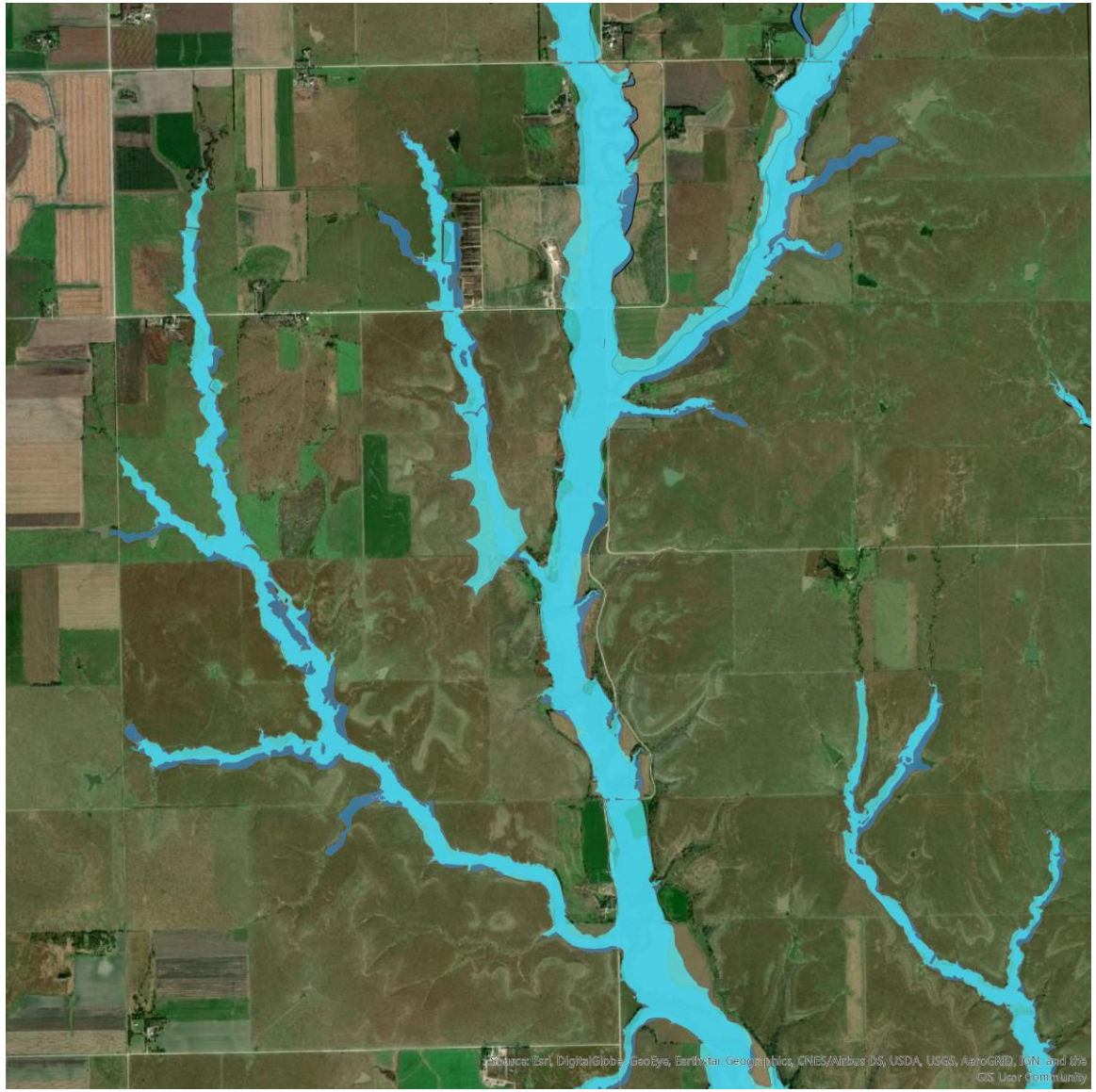
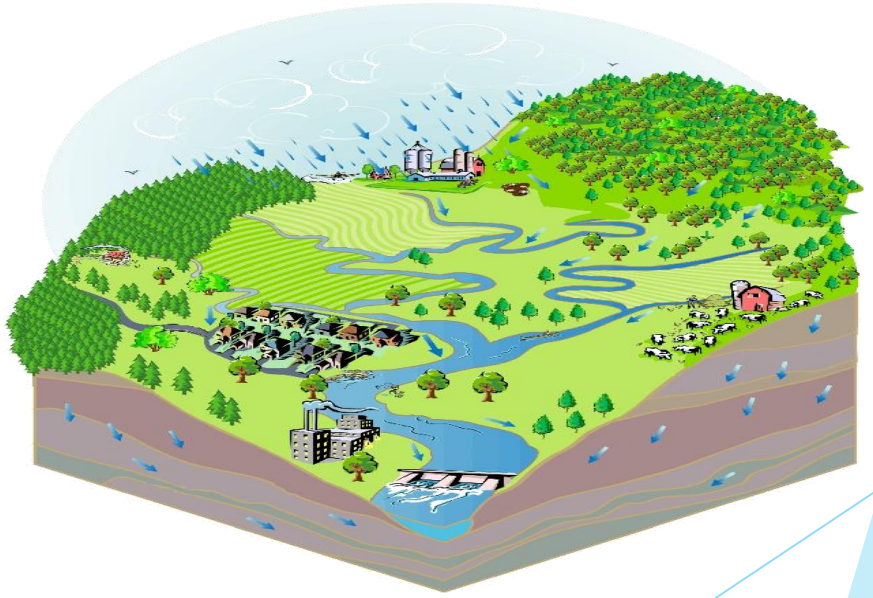


Hydrologic Analysis

- Determines the amount of water
- Peak Discharge (flow) is determined for the:
  - 10% flood event
  - 4% flood event
  - 2% flood event
  - 1% flood event
    - 1(+) flood event to show upper probability limits
  - 0.2% flood event



Hydrology Methods

- **Rainfall Runoff Modeling**
  - Models that mimic the characteristics of a watershed.
    - NWS Rainfall History
    - Infiltration (soils, pervious surfaces)
    - Storage (dams or other sinks)
    - Timing / Routing (how fast does water get from A to B)
  - Two modeling options:
    - 2-D Hec-Ras model, “excess rainfall-on grid”
      - used for BLE models
    - Hec-HMS models for verification/calibration

Hydrology Methods

- **Gage Analysis**
  - Statistical analysis of a stream's flow history.
  - What has happened in the past.
  - Used for calibrating/validating 2-D flow results
- **Regression**
  - USGS Equations
    - These were primarily used for Approximate Studies in the past
  - Used for validating 2-D flow results

Hydraulic Analysis

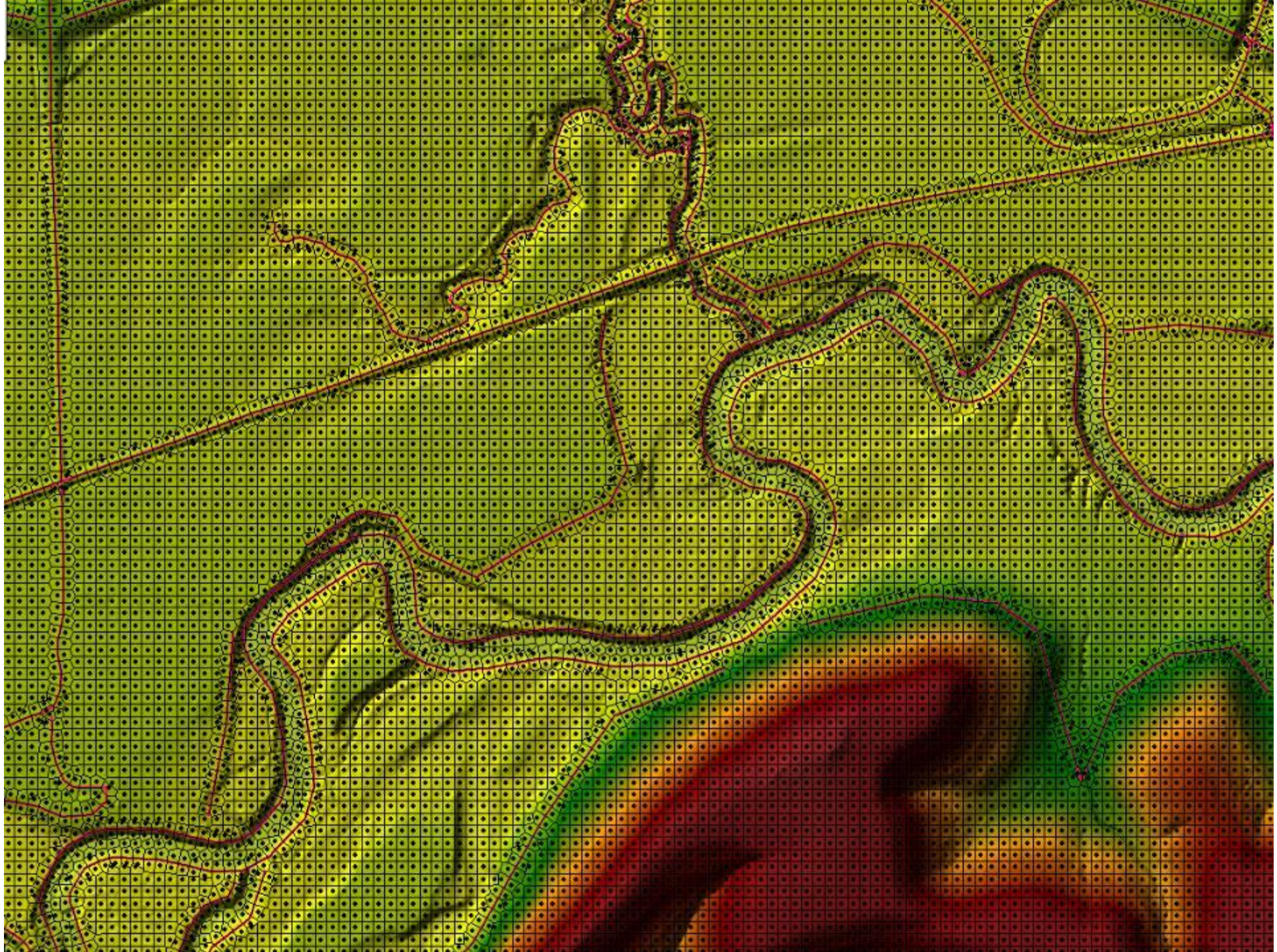
- Determines how high the water gets & where it goes
- Water surface elevations are determined for the:
  - 10% flood event
  - 4% flood event
  - 2% flood event
  - 1% flood event
    - 1(+) flood event to show upper probability limits
  - 0.2% flood event

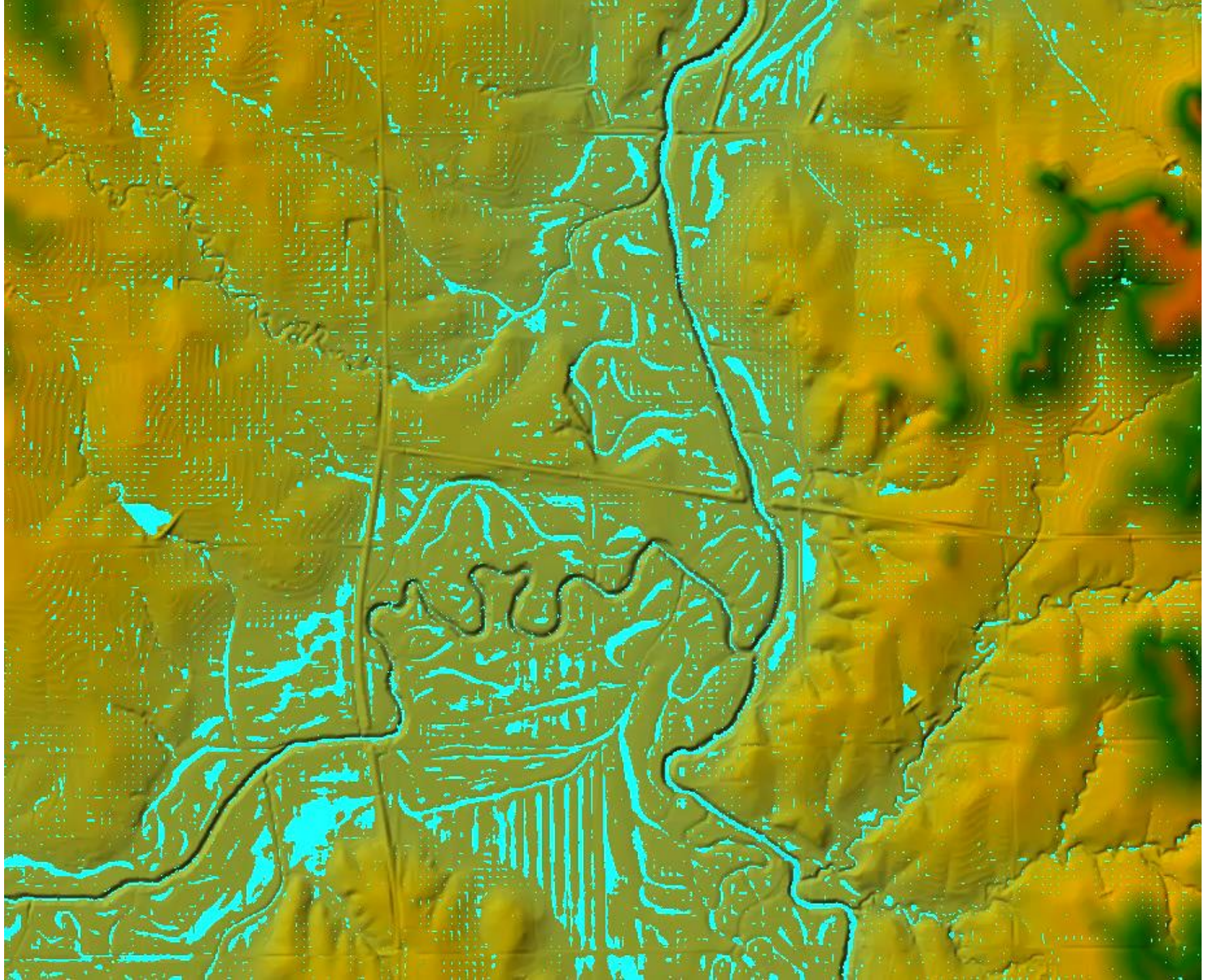
Hydraulic Methods

- **Modern computer models that consider variables affecting water conveyance**
  - Slope, Friction, Structures (culverts and bridges)(detailed studies), Sinuosity, Areas of Non-Conveyance (ineffective flow)
  - **2-D Approximate Analysis**
    - Utilizes free Hec-Ras 2-D modeling software
    - Uses gridded mesh approach to allow water to flow in multiple directions
    - Will utilize 2D BLE model and update based on areas of concern
    - No Base Flood Elevations (BFEs) on the regulatory map, but available
    - Water Surface Elevation and Depth Grids generated

Hydraulic Methods

- **2-D Limited Detail Study Analysis (Zone AE w/o floodway)**
  - Utilizes free Hec-Ras 2-D modeling software
  - Uses gridded mesh approach to allow water to flow in multiple directions
  - Will utilize 2-D BLE model and update based on areas of concern
  - Will include field-measured structure data
  - Base Flood Elevations (BFEs) on the regulatory map
  - Water Surface Elevation and Depth Grids generated





Marion County 2019 Mapping Updates

Scoped Studies

New Zone A- Excess Rainfall On Grid
New Zone A studies will be developed for these streams using 2D "excess rainfall-on-grid" hydrology, and Hec-Ras 2D hydraulics.

New Zone A - Gage Analysis
New Zone A studies will be developed for these streams using 2D "excess rainfall-on grid" hydrology calibrated to Gage Analysis Flows, and 2D Hec-Ras hydraulics.

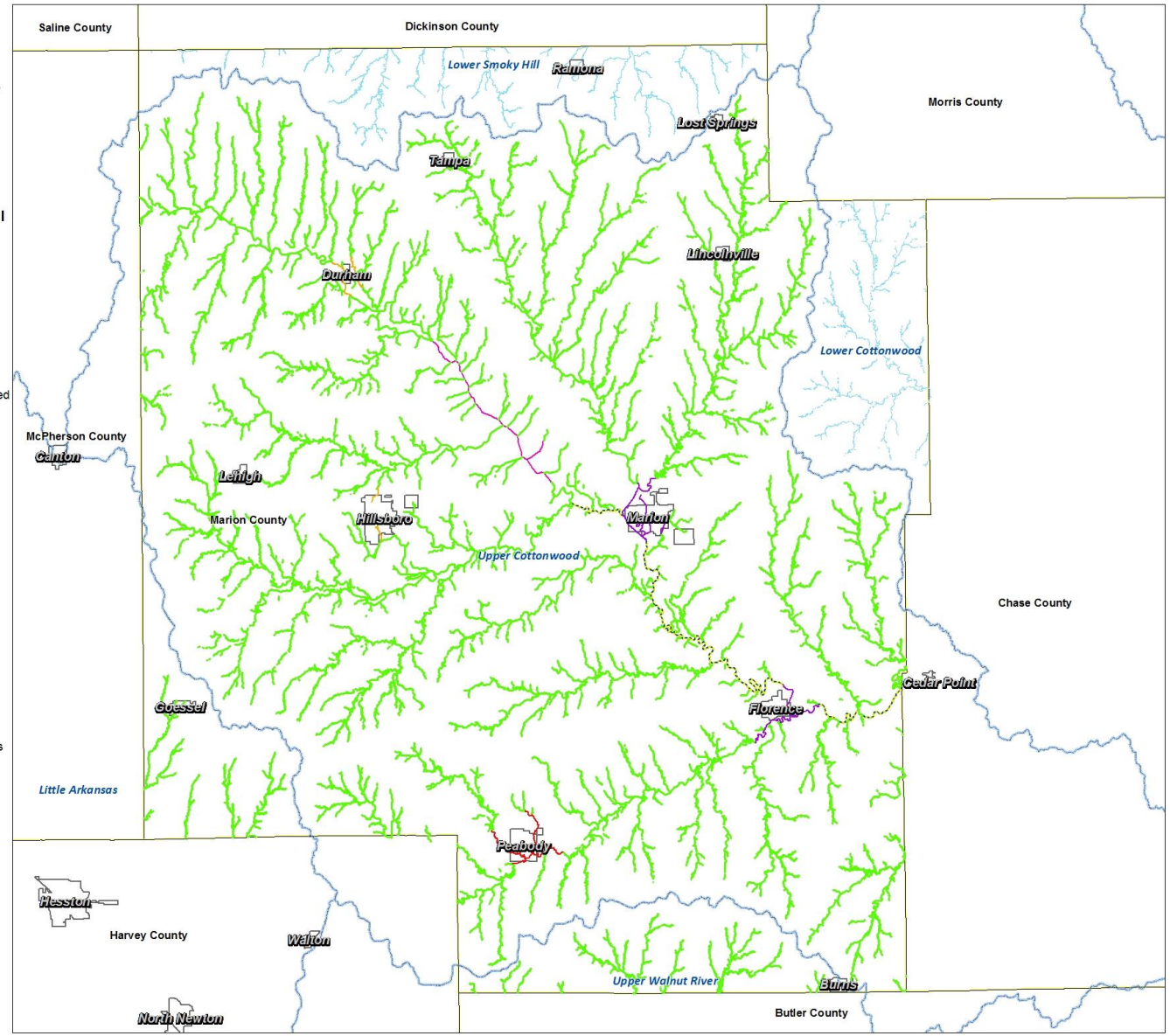
New Zone AE without Floodway - Rainfall Runoff
New Zone AE without floodway studies will be developed for these streams using 2D "excess rainfall-on-grid" hydrology calibrated to HEC-HMS Flows, and 2D Hec-Ras hydraulics. Field Measurements will be collected. No Floodway will be shown on the maps, but Base Flood Elevations will be shown.

New Zone AE With Floodway- Rainfall Runoff
New Zone AE with Floodway studies will be developed for these streams using Rainfall Runoff hydrology. Survey data will be collected. Either 1D or 2D HEC-RAS modeling will be used for hydraulics. A floodway will be developed.

New Zone AE -Existing Study
New studies developed during levee certification efforts exist for these streams through projects that were funded separately. Those floodplains will be iincorporated into this mapping.

New Static Zone AE
New Static Zone AE studies will be developed for these streams using a statistical frequency analysis.

New Zone A- Incorporation of Lower Cottonwood Watershed and Lower Smoky Hill Watershed Studies
New Zone A studies from the Lower Cottonwood Watershed and Lower Smoky Hill Watershed projects will be incorporated into the new mapping.



Data Development Proposed Scope

- Zone AE w/o floodway for :
  - Durham: North Cottonwood River, North Cottonwood River Tributary
  - Hillsboro: South Cottonwood River Tributary, French Creek Tributary
  - Detailed Hydrology
    - Calibration to Gage Analysis
    - Calibration to HEC-HMS Modeling
  - 2-D Hec-Ras Hydraulic Modeling with structures included

Data Development Proposed Scope

- Zone AE with floodway for :
  - Peabody: Doyle Creek, Prairie Creek, Spring Creek
  - Detailed Hydrology
    - Calibration to Gage Analysis
    - Calibration to HEC-HMS Modeling
  - 1-D or 2-D Hec-Ras Hydraulic Modeling with structures included

Data Development Proposed Scope

- Static AE for :
  - Marion Lake
  - Static lake elevation developed with data from USACE

Data Development Proposed Scope

- Use existing/ongoing studies for:
  - Marion
  - Florence

Data Development Proposed Scope

- Approximate Studies for all other streams with a drainage area of at least 1-square mile, or were previously mapped.
  - Excess Rainfall on Grid Hydrology
  - 2-D Hec-Ras Hydraulic Modeling

Technical Review Process

- Wood E&IS Review
  - Engineering reviewed by separate Wood E&IS office
  - Occurred during BLE creation
  - Will also occur during Data Development phase
- Independent Technical Review (ITR)
  - Will occur during Data Development phase
  - 3rd party review of engineering
  - AECOM
- KDA Review
  - Visual review
  - “eye test”
  - Identify impact of the map

What Should Community Officials DO?

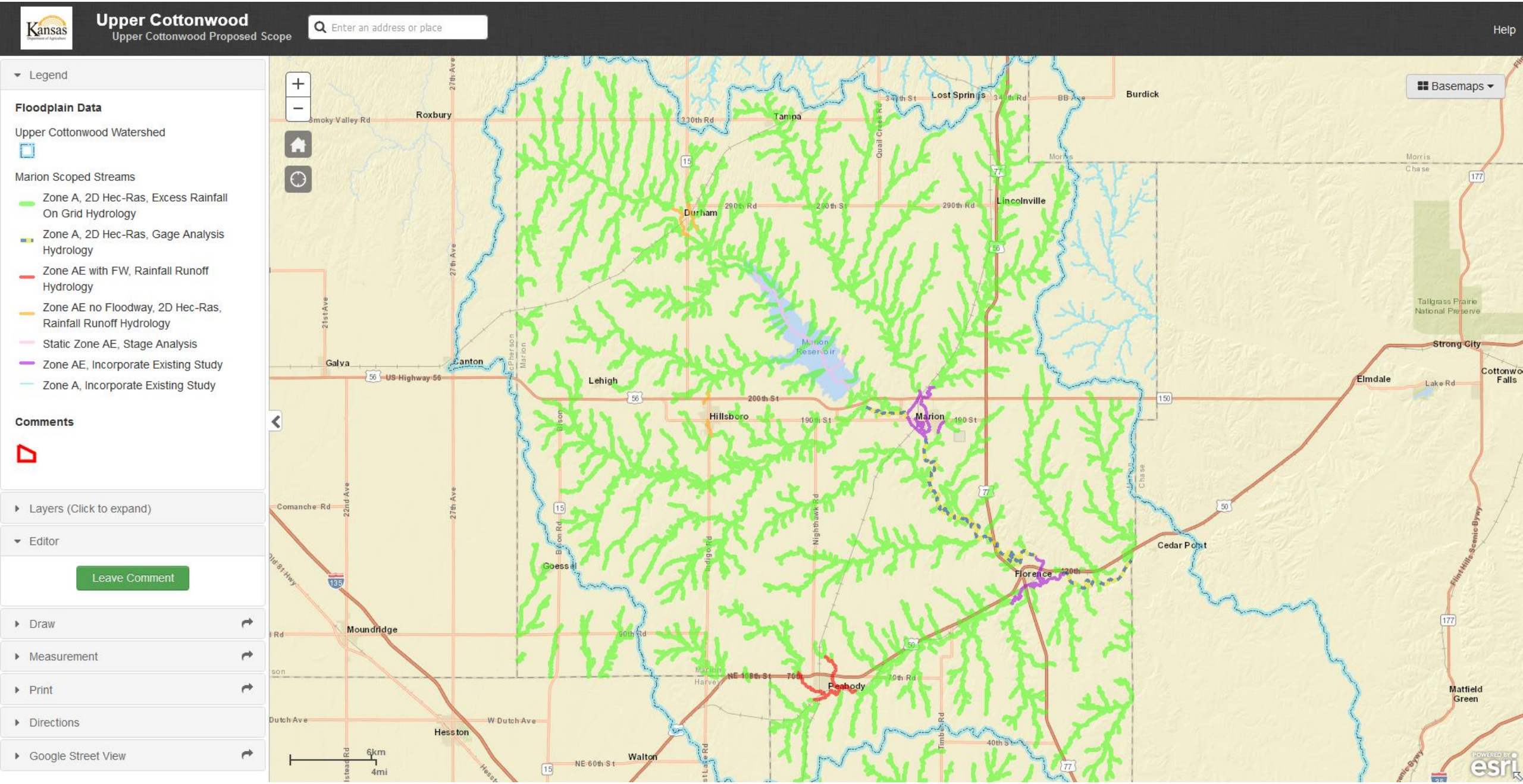
- Stay aware of the project
- Identification of Areas of Concern and provide any existing information (first task)
- ENGINEERING AND MAP REVIEW
- PUBLIC REVIEW NOTIFICATION
  - Inform public of map review opportunity
  - Encourage public participation
- PLAN PUBLIC OUTREACH
  - Public Open House
    - When, where, how, get the word out
  - Long Term Outreach

Staying Informed

- Email List
  - Provide names, addresses, and titles
  - Will be main source of project updates
- Project Updates
  - Minimum of quarterly
  - When important milestones are reached
  - When action is necessary (reminders)
- Meetings
  - 5 planned in-person meetings
    - Kickoff, Discovery Meeting, Flood Risk Review, Open House, Post-Preliminary CCO meeting
  - Others as needed
- **DON'T HESITATE TO CALL, WE ARE AVAILABLE**

Online Project Information

- **Project Website**
  - Scoping Maps, Project Timeline, Meeting Presentations, Newsletters, Technical Reports, Web Review Map
- **Web Review Map –** http://gis2.kda.ks.gov/gis/Upper_Cottonwood/
  - Project Scope Review
  - Draft Floodplain Review (when available)
- **Story Maps**
  - Project Info
  - “Floodplain Current”: Mapping Process ‘Nuts and Bolts’


Kansas
Upper Cottonwood
Upper Cottonwood Proposed Scope
Enter an address or place
Help
Legend
Floodplain Data
Upper Cottonwood Watershed
Marion Scoped Streams
Zone A, 2D Hec-Ras, Excess Rainfall On Grid Hydrology
Zone A, 2D Hec-Ras, Gage Analysis Hydrology
Zone AE with FW, Rainfall Runoff Hydrology
Zone AE no Floodway, 2D Hec-Ras, Rainfall Runoff Hydrology
Static Zone AE, Stage Analysis
Zone AE, Incorporate Existing Study
Zone A, Incorporate Existing Study
Comments
Layers (Click to expand)
Editor
Leave Comment
Draw
Measurement
Print
Directions
Google Street View
Basemaps
Roxbury
Tampa
Lost Springs
Burdick
Durham
Lincolnville
Marion Reservoir
Tallgrass Prairie National Preserve
Strong City
Galva
Canton
Lehigh
Hillsboro
Marion
Elmdale
Cedar Point
Florence
Goessel
Moundridge
Peabody
Hesston
Walton
Matfield Green
6km
4mi
esri

What Should You Do Next?

- **Project Scope Review**
  - Look at and understand the scope planned for your community.
  - Review and comment within 30 days (more if needed).
  - How do the stream extents look? Are we missing anything?
- **Provide Areas of Concern and Existing Data**
  - Provide information on community needs or areas of specific concern.
  - Do you have drainage studies, stormwater plans, capital improvement plans, upcoming projects?
- **Project Kickoff Survey**
  - Follow up email, please fill out and return
- **Organize Working Groups**

Key Takeaways

- Process is going to take time
  - Maps will not be Effective until 2021 or 2022
- **Get it right before Preliminary!**
  - Review information as it becomes available
  - Get out the word and encourage participation
- You need ownership of your regulatory map and to believe what it says
- We are available to answer your questions

Q & A

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